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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,568

09/20/2006

Hiroshi Ota

396.46598X00

1622

20457 7590 04/29/2008  
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EXAMINER

AHVAZI, BIJAN

ART UNIT

PAPER NUMBER

4171

MAIL DATE

DELIVERY MODE

04/29/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/593,568	<b>Applicant(s)</b> OTA ET AL.	
	<b>Examiner</b> BIJAN AHVAZI	<b>Art Unit</b> 4171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____.                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>09/20/2006</u> .  | 6) <input type="checkbox"/> Other: ____.                          |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102(b) that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) The invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 3, 4, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Momoda *et al.* (Pat. No. US 6,802,993 B2).

The applicants claim: A curable composition comprising:

- (1) a radically polymerizable monomer;
- (2) an organosilicon compound containing an epoxy group bonded to one terminal end;
- (3) an amine compound;
- (4) a photochromic compound; and
- (5) a photopolymerization initiator, said organosilicon compound (2) containing an epoxy group bonded to one terminal end thereof being a compound containing a silanol group or a compound containing a group capable of forming a silanol group by hydrolysis thereof.

3. Momoda *et al.* discloses a curable composition comprising,

- (1) A radically polymerizable monomer which gives a polymer having an L-scale Rockwell hardness of 60 or more, particularly 65 to 130 when it is homopolymerized is used as the component (A) to increase the hardness of the cured product and the fading speed of

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photochromism such as the radically polymerizable group may be used any known radically polymerizable group such as (meth)acryloyl group, derivative group of a (meth)acryloyl group such as (meth)acryloyloxy group, (meth)acryloylamino group or (meth)acryloylthio group, vinyl group, allyl group or styryl group. When the radically polymerizable group is a vinyl group, allyl group or styryl group, the radically polymerizable group may have a substituent (page 4, line 45-52).

**(2)** The reference also relates to the radically polymerizable monomers in the curable composition include the component (C) which is a radically polymerizable monomer other than the components (A) and (B). The polymerizable monomer(C) has at least one radically polymerizable group and at least one epoxy group (page 6, line 46-47), at one terminal end (page 8, line 55-63, formula 5), thereof being a compound containing a silanol group or a compound containing a group capable of forming a silanol group by hydrolysis (page 29, claim 1(B), and claim 2, 4 (ii)).

**(3)** To improve adhesion to the cured product, a pretreatment such as a reagent treatment with an aqueous solution of sodium hydroxide (i.e. an amine compound), or potassium bichromate/sulfuric acid solution, or discharge treatment with plasma is preferably carried out (page 20, lines 28-32 and see page 23, Example 1, line 33).

**(4)** Any known photochromic compound may be used as the photochromic compound which is used as the component (D) in the curable composition as disclose in the reference. Illustrative examples of the photochromic compound include fulgimide compounds, spirooxazine compounds and chromene compounds which are well known as photochromic compounds (page 12,lines 1-5) and,

**(5)** Any known radical polymerization initiator may be used. Typical examples of the radical polymerization initiator that include in the reference are diacyl peroxides such

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(page 19, lines 18-29) as benzoyl peroxide, p-chlorobenzoyl peroxide, decanoyl peroxide, lauroyl peroxide and acetyl peroxide; peroxy esters such as t-butyl peroxy-2-ethyl hexanoate, t-butyl peroxydicarbonate, cumyl peroxyneodecanate and t-butyl peroxybenzoate; percarbonates such as diisopropyl peroxydicarbonate, di-2-ethylhexyl peroxydicarbonate and di-sec-butyloxycarbonate; and azo compounds such as 2,2'-azobisisobutyronitrile, 2,2'-azobis(4-dimethylvaleronitrile), 2,2'-azobis(2 methylbutyronitrile) and 1,1'-azobis(cyclohexane-1-carbonitrile).

Momoda *et al.* discloses the cured product coat (page 19, line 62) with a hard coat agent essentially composed of a silane coupling agent or a sol of silicon, zirconium, antimony or aluminum oxide (hard coat agent cured by a so-called "condensation method") or a hard coat agent (page 19, line 65) essentially composed of an organic polymer, or subjected to an anti-reflection treatment (page 20, line 3) by depositing a metal oxide thin film or applying an organic polymer thin film, antistatic treatment or secondary treatment. Furthermore, the photochromic cured product of the reference which has photochromism features can be obtained from the curable composition (page 29, line 11), and it is useful as an optical material such as a photochromic lens material (page 29, line 14) that satisfies the applicant limitation claims 8-11. Therefore all the instant application claims are as being anticipated by Momoda *et al.*

### ***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject

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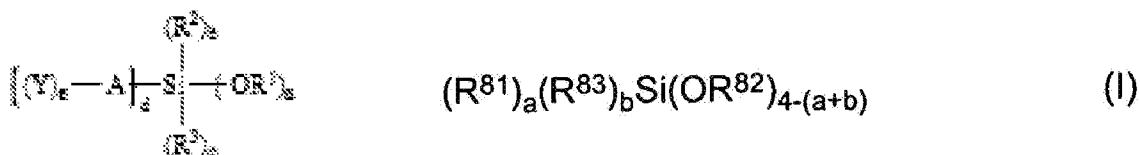
matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 2, 3, 4, 5, 6-7, 8-11, and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nagoh *et al.* (Pat. No. US 2006/0264593 A1) in view of Momoda *et al.* (Pat. No. US 6,802,993 B2).

6. Nagoh *et al.* discloses a curable composition comprising:

(1) 100 parts by weight of radically polymerizable monomers (abstract line 5),

(2) 0.1 to 20 parts by weight of a silicon compound having a silanol group or a functional group for forming a silanol group upon hydrolysis and no radically polymerizable group (abstract, line 1). Examples of the silyl compounds discussed in the reference are compounds represented by the following formula (1) on the left as compared to the instant applicant by formula (1) on the right.



wherein  $\text{R}_1$  is an alkyl group or aryl group,  $\text{R}_2$  and  $\text{R}_3$  are each independently an alkyl group, aryl group, acyl group or halogen atom, A is a bivalent to tetravalent organic residue, Y is a halogen atom such as fluorine atom, chlorine atom or bromine atom, hydroxyl group, amino group, mercapto group, cyano group, and in particular epoxy group (page 12, ¶0106), such as silyl compounds ( $\gamma$ -glycidoxypolytrimethoxysilane), isocyanate group, ureido group or glycidyl group, "a" is an integer of 1 to 3, "b" is an integer of 0 to 2, "c" is an integer of 0 to 2, "d" is an integer of 1 to 3, and "e" is an integer of 1 to 3, with the proviso that  $a+b+c+d=4$  (page 2, formula 1). It is preferably an alkyl group in the above formula has 1 to 10 carbon atoms in the

main chain or aryl group have 6 to 10 ring. The alkyl group or aryl group may have a substituent which is selected from an alkyl group having 1 to 10 carbon atoms (page 3, ¶0025).

(3) A curing catalyst consists of a compound such as one of these amine compounds may be used alone or in combination of two or more. The amount of the curing catalyst is preferably 0.01 to 2.0 parts by weight, more preferably 0.1 to 10 parts by weight, particularly preferably 1 to 10 parts by weight based on 100 parts by weight of the total of all the radically polymerizable monomers. When the amount of the curing catalyst is smaller than 0.01 parts by weight or larger than 20 parts by weight, its effect of improving adhesion between the coating layer and the substrate is hardly obtained (page 8, ¶0061). The amine compound may be used if it is a basic compound which functions as an addition reaction catalyst or the above silyl compound. Examples of the amine compound which can be suitably used in the reference include nonpolymerizable low molecular weight amine compounds such as triethanolamine, N-methyldiethanolamine, triisopropanolamine, diazabicyclooctane, and 4, 4 dimethylaminobenzophenone, amine compounds having a polymerizable group such as N, N-dimethylaminoethyl methacrylate and N, N-diethylaminoethyl methacrylate (page 8, ¶0060).

(4) 0.01 to 20 parts by weight of a photochromic compound, wherein the radically polymerizable monomers include a radically polymerizable monomer having an epoxy group in the molecule (abstract, line 6) and,

(5) The amount of the thermal polymerization initiator which differs according to polymerization conditions, the type of the initiator and the types and ratio of the polymerizable monomers and cannot be limited unconditionally is preferably 0.01 to 10 parts by weight based on 100 parts by weight of the total of all the polymerizable monomers (page 10, ¶0075).

Although the curable composition of the Nagoh *et al.* is cured by using the polymerization initiator to be used as a photochromic material by itself (page 11, ¶0090), it is

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particularly preferably also used as a coating for a substrate, for example, an optical substrate, preferably an optical material such as a spectacle lens made of plastic or glass (page 11, ¶0089). When the curable composition is used as a coating for spectacle lenses, it may be used for any type of spectacle lenses, preferably plastic spectacle lenses. Furthermore, the secondary treatment such as an anti-reflection or antistatic treatments can be made on the surface (page 11, ¶0093), wherein the surface of a cured product of the composition alone or the hard-coated (page 11, ¶0090 and ¶0093) or naked surface of the coating layer formed by using the coating, by the deposition of a thin film of a metal oxide or the application of an organic polymer thin film.. Therefore all the instant application claims 2, 5-6, 7, 12-14 are as being satisfied by Nagoh *et al.* However, Nagoh *et al.* does not explicitly disclose a silicon compound having a silanol group or a functional group for forming a silanol group upon hydrolysis with radically polymerizable group.

Momoda *et al.* discloses a curable composition comprising,

(1) A radically polymerizable monomer such that when the radically polymerizable group is a vinyl group, allyl group or styryl group, the radically polymerizable group may have a substituent (page 4, line 45-52).

(2) The reference also relates to the radically polymerizable monomers in the curable composition include the component (C) which is a radically polymerizable monomer other than the components (A) and (B). The polymerizable monomer(C) has at least one radically polymerizable group and at least one epoxy group (page 6, line 46-47), at one terminal end (page 8, line 55-63, formula 5), thereof being a compound containing a silanol group or a compound containing a group capable of forming a silanol group by hydrolysis (page 29, claim 1(B), and claim 2, 4 (ii)).



(3) To improve adhesion to the cured product, a pretreatment such as a reagent treatment with an aqueous solution of sodium hydroxide (i.e. an amine compound), or potassium bichromate/sulfuric acid solution, or discharge treatment with plasma is preferably carried out (page 20, lines 28-32 and see page 23, Example 1, line 33).

(4) Any known photochromic compound may be used as the photochromic compound which is used as the component (D) in the curable composition. Illustrative examples of the photochromic compound include fulgimide compounds, spirooxazine compounds and chromene compounds which are well known as photochromic compounds (page 12, lines 1-5) and,

(5) Any known radical polymerization initiator may be used. Typical examples of the radical polymerization initiator include diacyl peroxides such (page 19, lines 18-29) as benzoyl peroxide, p-chlorobenzoyl peroxide, etc.

Additionally, Momoda *et al.* discloses the cured product coat (page 19, line 62) with a hard coat agent essentially composed of a silane coupling agent. Furthermore, the photochromic cured product of the reference which has photochromism features can be obtained from the curable composition (page 29, line 11), and it is useful as an optical material such as a photochromic lens material (page 29, line 14) that satisfies the applicant limitation claims 1, 3, 4, and 8-11. However, Momoda *et al.* does not explicitly disclose a curable composition (i.e. parts by weight). Therefore all the instant application claims are obvious by Momoda *et al.*

It would have been obvious to one having ordinary skill in the art to utilize Momoda *et al.* teaching of providing selected species for a photochromic cured product compound with a radically polymerizable monomer, an organosilicon compound containing an epoxy group bonded to one terminal end, an amine compound, a photochromic compound; and a

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photopolymerization initiator as disclosed in the instant application in the composition of Nagoh *et al.* with the motivation to provide a curable composition, an optical member comprising an optical substrate, a photochromic coating layer formed by applying the curable composition onto the optical substrate and curing the composition, as well as the curable composition used for producing the optical member. It would have been obvious to one having ordinary skill in the art at the time the invention to have optimized the amounts of the materials for a particular application as this merely involves routine experimentations; it is clear from the above discussion what each material provides to the composition.

***Prior-Art Cited But Not Applied***

Any prior-art reference which is cited on FORM PTO-892 but not applied is cited to show the general state of the prior-art at the time of the application's invention. Kadowaki *et al.* (Pat. No. US 6,913,357 B2) discloses a method of manufacturing plastic photochromic lenses comprising: obtaining a lens by polymerizing and curing a monomer mixture comprising at least: one of a monofunctional and bifunctional methacrylic ester monomers, a trifunctional or greater methacrylic ester monomer in an amount of 1 to 30 weight percent of the monomer mixture; and at least one photochromic dye; directing radiation comprising ultraviolet radiation of a wavelength of less than or equal to 300 nm onto at least a portion of a surface of the lens obtained so that the radiation activates the surface of the lens to break down macromolecular chains of the surface of the lens; coating a composition onto the at least a portion of the surface of the lens that has been exposed to said radiation, the composition comprising: an organic silicon compound comprising at least one alkoxy group and at least one epoxy group; and a colloidal metal oxide; and curing said coating to obtain a hard surface film. The plastic

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photochromic lens obtained by the manufacturing method of above and producing eyeglasses. Momoda *et al.* (Pub. No. US 2004/0220292 A1) discloses a curable composition comprising: (1) 100 parts by weight of radically polymerizable monomers; (2) 0.01 to 20 parts by weight of an amine compound; and (3) 0.01 to 20 parts by weight of a photochromic compound, said radically polymerizable monomers including a radically polymerizable monomer having a silanol group or a group which forms a silanol group by hydrolysis, and/or a radically polymerizable monomer having an isocyanate group. The curable composition comprises a photopolymerization initiator, and a photochromic cured product obtained by curing the curable composition for coating. A photochromic optical material comprising a substrate having at least one surface coated with a cured product of the curable composition and a process for producing a photochromic optical material comprising a substrate having at least one coated surface, wherein the coating composition containing a photochromic compound is a curable composition comprising: (1) 100 parts by weight of radically polymerizable monomers; (2) 0.01 to 20 parts by weight of an amine compound; and (3) 0.01 to 20 parts by weight of a photochromic compound. The radically polymerizable monomers include a radically polymerizable monomer having a silanol group or a group which forms a silanol group by hydrolysis, and/or a radically polymerizable monomer having an isocyanate group.

### ***Examiner Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Bijan Ahvazi whose telephone number is (571)270-3449. The examiner can normally be reached on M-F 8:0-5:0. (Off every other Friday).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/  
Supervisory Patent Examiner, Art Unit 4171

Bijan Ahvazi, Ph.D.  
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/BA/